

CLAIMS

1. A method of expanding types of synchronous motors each having a stator formed by stacking stator cores and a rotor with permanent magnets, comprising the steps of:

(a) preparing a group of stators by stacking stator cores of identical shape so that heights of the stators are different to one another to be multiplied values of a fundamental height by a predetermined number in accordance with predetermined output torque specification values and predetermined rotor inertia specification values;

(b) preparing a plurality of groups of rotors so that lengths of the rotors in each group are different to one another to be multiplied values of a fundamental length by a predetermined number in accordance with the predetermined rotor inertia specification values, said rotors in each group being provided with permanent magnets having a residual magnetic flux density different from that of permanent magnets of the rotors in another group in accordance with the predetermined output torque specification values; and

(c) selecting a stator from a group of the stators prepared in said step (a) and a rotor from groups of the rotors prepared in said step (b) in accordance with a preset output torque specification value and a preset rotor inertia specification value, and combining the selected stator with the selected rotor.

2. A synchronous motor having a stator formed by stacking stator cores and a rotor with permanent magnets, said synchronous motor being produced by a method of expanding motor types comprising the steps of:

(a) preparing a group of stators by stacking stator cores of identical shape so that heights of the stators are different from one another to be multiplied value of a fundamental height in accordance with predetermined output torque specification values and predetermined rotor inertia specification values;

(b) preparing a plurality of groups of rotors so that lengths of the rotors in each group are different from one another to be multiplied values of a fundamental length in accordance with predetermined rotor inertia specification values, said rotors in each group being provided with permanent magnets having a residual magnetic flux density different from that of permanent magnets of the rotors in another group in accordance with predetermined output torque specification values; and

(c) selecting a stator from said group of the stators prepared in the step (a) and a rotor from said groups of the rotors prepared in the step (b) in accordance with a preset output torque specification value and a preset rotor inertia specification value, and combining the selected stator with the selected rotor.

3. The synchronous motor according to claim 2, wherein the permanent magnets provided in the rotors in each group are radially arranged at identical positions in circumferential and radial directions.

4. The synchronous motor according to claim 2 or 3, wherein the permanent magnets are affixed to a surface of each rotor.

5. The synchronous motor according to claim 2 or 3, wherein the permanent magnets are embedded in a core of each rotor.